

# Description of a new *Eoophyla* species from North Borneo with some notes on its biology (Lepidoptera: Pyraloidea, Crambidae, Acentropinae)

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**Abstract:** A new species of *Eoophyla* from North Borneo (Sabah) is described: *E. dendrophila* n. sp. The female holotype is deposited in Museum für Naturkunde, Berlin, Germany. The altitudinal range, flight activity and habitat of the species are recorded. More females than males are found at light, a usual observation in almost all species of Acentropinae.

## Beschreibung einer neuen *Eoophyla*-Art von Nordborneo mit einigen Anmerkungen zur Biologie (Lepidoptera: Pyraloidea, Crambidae, Acentropinae)

**Zusammenfassung:** Eine neue *Eoophyla*-Art aus Nord-Borneo wird beschrieben: *E. dendrophila* n. sp. Der weibliche Holotypus befindet sich im Museum für Naturkunde, Berlin. Höhenverbreitung, Flugaktivität und Habitat der neuen Art werden angegeben. Es wurden mehr Weibchen als Männchen am Licht gefunden, eine Beobachtung, die für fast alle Acentropinae-Arten zutrifft.

## Introduction

There is no modern revision of *Eoophyla* SWINHOE, 1900, a genus which is distributed in the Afrotropical, Oriental and Australian regions with a few species penetrating into the East Palearctic Region. The last comprehensive treatment of the genus in the Oriental Region was published by SNELLEN (1876) who named the genus *Oligostigma* which is now restricted to the New World. Recently, revisions have been published for the species of Thailand (YOSHIYASU 1987) and Japan (YOSHIYASU 1985). A total of 48 Oriental species are enumerated and ordered in groups according to similarity of wing-pattern (SPEIDEL & MEY 1999a). In the meanwhile, a new species belonging to the *gibbosalis*-group has been described from the Philippines (SPEIDEL & MEY 1999b) and the descriptions of several additional species from the Philippines are in preparation so that the number of known *Eoophyla* species in the Oriental Region is over 50. There are, however, many more undescribed species known to the authors so that the final number of Oriental species could easily double that figure.

We prefer to place the new species in the *gibbosalis*-group characterized by 3 eye-spots rather than in the *crassicornalis*-group with 2 eye-spots as the more similar species are found in the first group. Only the two more apical eye-spots at the hindwing-margin are well developed with a white ring, while the third one is reduced and does not show a white ring. Similarly, we placed *E. hauensteini* SPEIDEL & MEY, 1999 in the *gibbosalis*-

group albeit the third spot is also reduced in that species. The division of the genus *Eoophyla* in species-groups according to the number of eye-spots in the hindwing does probably not reflect phylogenetic relationships, but may help in the identification.

Within the *gibbosalis*-group, there is no species which is very close to the new one. However, in *Eoophyla gibbosalis* (GUENÉE, 1854), *E. hirsuta* (SEMPER, 1902) and the new species, the white ground-colour of the hindwing is infusate, whereas it is whitish in the other species. The new species differs from all members of this group in that the submarginal line is removed from the wing-margin to a more or less central position. Therefore, the infusate medial (= central) area is reduced to a narrow strip close to the orange base. Such a reduced medial area of the hindwing is not found in any other *Eoophyla*-species so far known to us.

## *Eoophyla dendrophila* n. sp. (Figs. 1 & 2)

**Holotype** ♀: "Borneo, E-Malaysia, Sabah, Kinabalu NP, Poring Hot Springs, Tourist Canopy Walkway, 650 m, Dipterocarp Forest, Understorey, LF 10. ix. 1993, leg. C. SCHULZE"; in coll. Museum für Naturkunde, Berlin (Germany).

**Paratypes** (in total 36 ♂♂, 30 ♀♀): same data as holotype, 1 ♀ 24. vii. 1993, leg. C. H. SCHULZE (= CHS); 1 ♀ 9. ix. 1993, leg. CHS; 1 ♂ 3. iii. 1997, leg. CHS et al.; 2 ♂, 2 ♀♀ 29. iii. 1997, leg. CHS et al.; 2 ♂♂ 3. iv. 1997, leg. CHS et al.; 1 ♂ 10. v. 1997, leg. CHS et al.; 1 ♀ 30 viii. 1997, leg. CHS et al.; 3 ♂♂, 2 ♀♀ 6. ix. 1997, leg. CHS et al.; 3 ♀♀ 11. ix. 1997, leg. CHS et al.; 1 ♂, 1 ♀ 8. iv. 1999, leg. CHS et al. • Borneo, E-Malaysia, Sabah, Kinabalu NP, Poring Hot Spring, 630 m, Primary Dipterocarp forest, Por2: 1 ♂ 11. iii. 1997, leg. CHS et al.; 1 ♂ 28. iii. 1997, leg. CHS et al.; 1 ♂, 1 ♀ 5. iv. 1997, leg. CHS et al.; 2 ♂♂ 3. v. 1997, leg. CHS et al.; 1 ♂ 9. v. 1997, leg. CHS et al.; 1 ♀ 16. ix. 1997, leg. CHS et al. • Borneo, E-Malaysia, Sabah, Kinabalu NP, Poring Hot Spring, 600 m, Primary Dipterocarp forest, Por3: 1 ♀ 11. iii. 1997, leg. CHS et al.; 1 ♂, 1 ♀ 3. v. 1997, leg. CHS et al.; 1 ♀ 9. v. 1997, leg. CHS et al. • Borneo, E-Malaysia, Sabah, Kinabalu NP, Poring Hot Spring, 520 m, Secondary Dipterocarp forest, Por4: 3 ♀♀ 9. iv. 1997, leg. CHS et al.; 1 ♀ 18. ix. 1997, leg. CHS et al. • Borneo, E-Malaysia, Sabah, Kinabalu NP, Poring Hot Spring, 480 m, Secondary Dipterocarp forest, Por5: 1 ♂ 14. iii. 1997, leg. CHS et al.; 1 ♀ 7. v. 1997, leg. CHS et al. • Ost-Malaysia, Sabah, Mount Kinabalu Park, Poring Hot Springs, 6°02'–04'N 116°41'–43'E, 500–800 m: 1 ♂ 15. xii. 1995, leg. C. L. HÄUSER. • Borneo, E-Malaysia, Sabah, Crocker Range NP, Road Keningau-Kimanis, 19.5 km behind Park Headquarters, N 5°26.6'E 116°4.8', 1230 m, primary forest, CRA4: 1 ♂ 9. ix. 1998, leg. CHS et al.; 1 ♂, 3 ♀♀ 9. viii. 1999, leg. CHS et al.; 1 ♀ 10. viii. 1999, leg. CHS et al.; 1 ♂, 1 ♀ 11. viii. 1999,

leg. CHS et al.; 1 ♂ 12. VIII. 1999, leg. CHS et al. • These paratypes will be deposited in the Museum für Naturkunde, Berlin (Germany), Natural History Museum, Stuttgart (Germany), Zoologisches Forschungsinstitut und Museum A. Koenig, Bonn (Germany), Forschungsinstitut und Natur-Museum Senckenberg, Frankfurt am Main (Germany), and in coll. Christian H. SCHULZE.

**Further paratypes:** 1 ♂ Borneo, E-Malaysia, Sabah, Kinabalu NP, Poring Hot Springs, Tourist Canopy Walkway, 650 m, Dipterocarp-Forest, Canopy LF 24. VIII. 1993, No. 4439, leg. CHS; genitalia slide No. ♂ 491 W. SPEIDEL. 1 ♀ Borneo, E-Malaysia, Sabah, Kinabalu NP, Poring Hot Spring, 600 m, Primary Dipterocarp forest, POR 3, 3. v. 1997, 19.30–20.00 h, leg. CHS et al.; genitalia slide No. ♀ 492 W. SPEIDEL. Coll. W. SPEIDEL, Bonn (Germany). • 2 ♂♂ Sabah, K. K., Kiansom, 20. III. 1997, D. J. L. AGASSIZ; 2 ♀♀ Sabah, K. K., Kiansom, 4. IV. 1997, D. J. L. AGASSIZ; 2° Forest at light. Coll. AGASSIZ, Gravesend (England). • 3 ♀♀ Sabah: 945 m, Gunong Monkobo, 116.56 E, 5.48 N, Dipterocarp for., 14.–23. VIII. 1987. Natural History Museum, London (England).

**Etymology:** Dendros = tree; phileo = to love (Greek).

## Description

Wingspan: ♂: 24–30 mm (length of forewing: 11–14 mm), ♀: 30–37 mm (length of forewing: 13.5–16 mm).

Forewing predominantly grayish-brown, white ground colour reduced to a narrow line before the brown submarginal area and a white costal triangular spot of the outer (= postmedial) area. There are two orange longitudinal stripes which broaden distally from base to about middle of the wing, one of them in the costal area, the other one below the cell.

Hindwing predominantly grayish-brown, with traces of a darker marginal line. There is a deep incision in the margin below apex, two black eye-spots with a white ring below this incision and traces of a third black eye-spot without white ring. Submarginal line broad, orange, about in the middle of the wing. Basal area orange.

**♂ genitalia** (Fig. 3): General structure as in all other species of the genus, with 2 apical setae of about half of the length of the valva. Aedeagus comparatively short.

**♀ genitalia** (Fig. 4): General structure as in the other species of the genus. Corpus bursae elongate, with broad longitudinal signum consisting of two parallel bands of stronger sclerotisation filling almost the whole length of the corpus. The signum-structure is very similar to that found in *E. gibbosalis*, however the corpus bursae in *gibbosalis* is more globular.

**Distribution:** So far only known from Sabah, Borneo.

**Relationship:** The infusate white ground colour and the structure of the signum in the female genitalia seem to indicate a sister-group relationship of the new species with the species-pair *Eoophyla gibbosalis* and *E. hirsuta*.

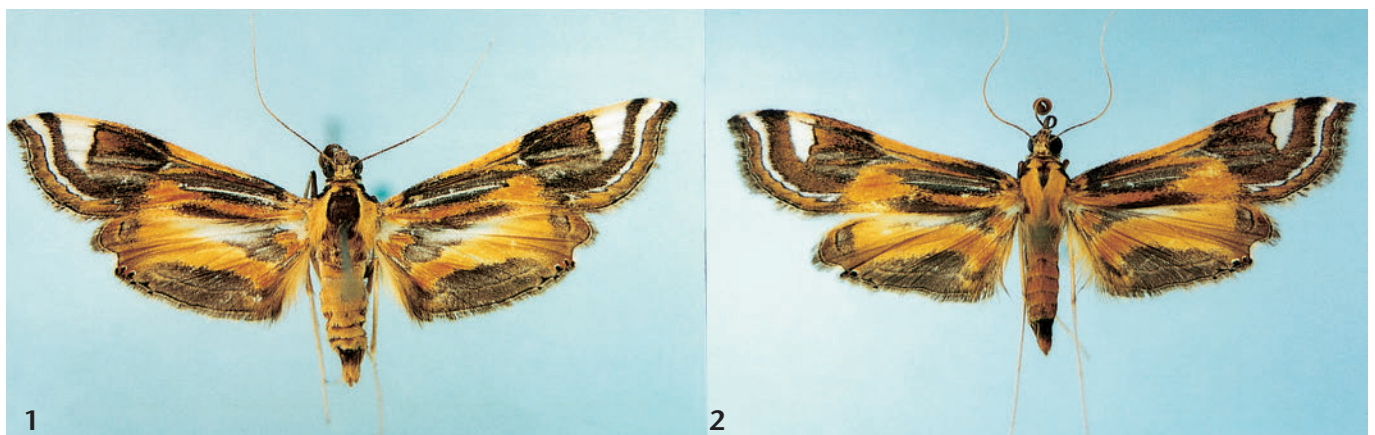
## Discussion

We only include the specimens observed by CHS in our ecological evaluation. In total 52 specimens have been attracted by light, 23 ♂♂ and 29 ♀♀. Therefore, the sex ratio recorded by light trapping was ♂♂ : ♀♀ = 0.79 : 1.

Records of *Eoophyla dendrophila* n. sp. cover an altitudinal range between 480 and 1200 m a.s.l. Most specimens have been collected between 500 and 1000 m (see Fig. 5), in a altitudinal zone designated as “hill forest” by KITAYAMA (1992).

Fig. 6 shows the flight activity pattern of *Eoophyla dendrophila* n. sp. The species seems to have an activity peak between 19:00 and 21:00 h. Although extensive standardized light trapping was not conducted during the second half of the night, not even a single specimen has been found accidentally at light sources of, e.g. ranger stations located at the forest margin after 22:00 h.

As shown in Fig. 7, *Eoophyla dendrophila* n. sp. seems to be restricted generally to forest habitats where reaching the highest abundance at primary forest sites. Although intensive light trapping was conducted in several open cultivated habitats, not a single specimen could be recorded in these areas. Remarkably, the highest number of specimens (21) was recorded in the canopy (45 m



**Colour plate: Figs. 1–2:** Types of *Eoophyla dendrophila* n. sp. **Fig. 1:** Holotype ♀. **Fig. 2:** Paratype ♀, Sabah, Kinabalu NP, Poring Hot Springs, 520 m, secondary dipterocarp forest, Por4, 9. IV. 1997, 20.00–20.30 h, leg. CHS et al.



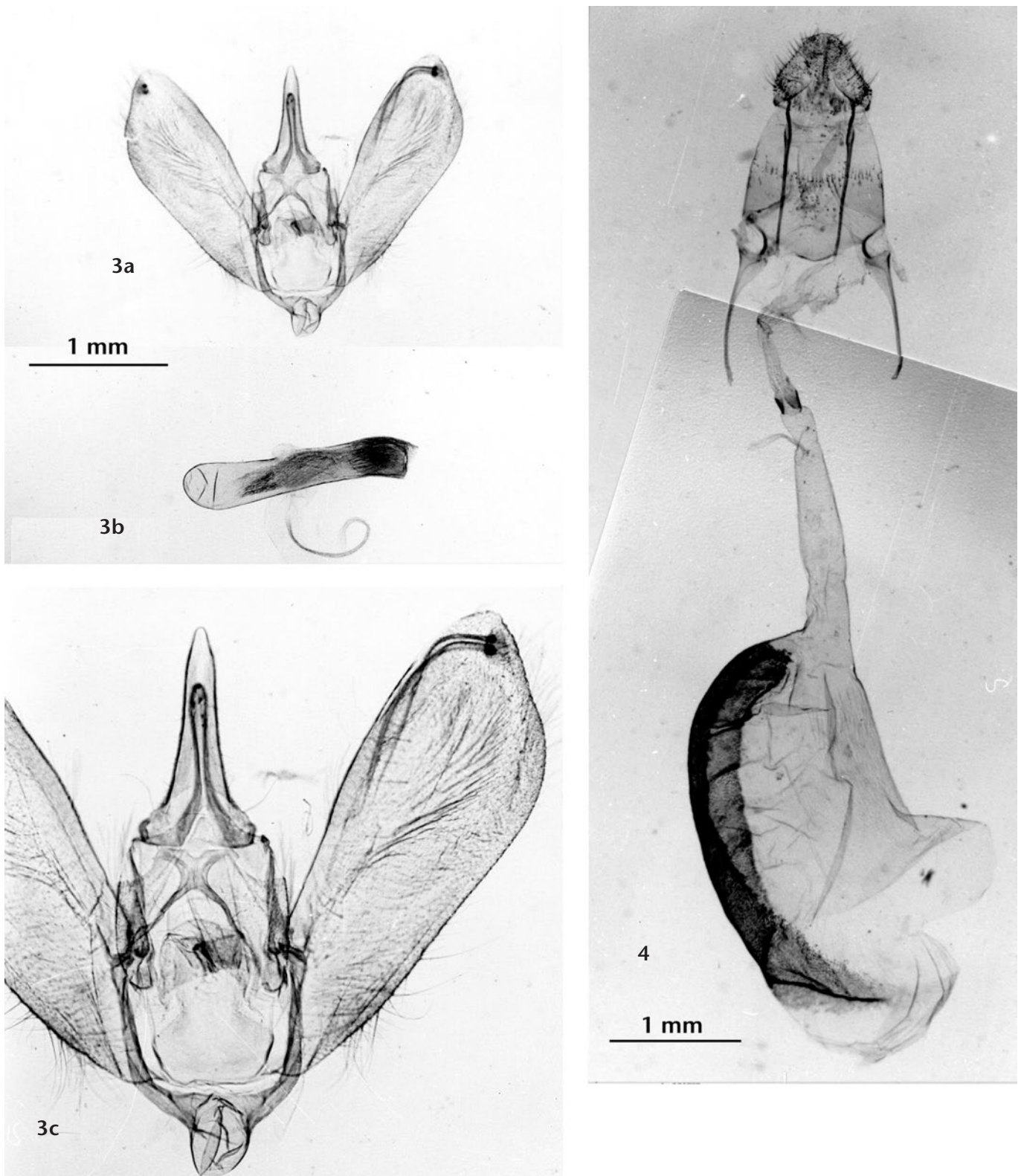


Fig. 3: ♂ genitalia of *Eoophyla dendrophila* n. sp. Fig. 3a: ♂ genitalia. Fig. 3b: aedeagus. Fig. 3c: ♂ genitalia further enlarged. Fig. 4: ♀ genitalia of *Eoophyla dendrophila* n. sp.

above ground) at a hill forest site in the vicinity of Poring Hot Springs (Mount Kinabalu National Park), where it was possible to achieve easy access to the upper vegetation layers of the forest using available canopy walkways (for detailed description of collecting site see SCHULZE 2000). It can be supposed that dispersal behaviour of this *Eoophyla* species took place above the forest canopy, which is also likely for a number of further *Eoophyla*

species (SCHULZE 2000). However, it appears to be unlikely that any larval or imaginal resources of this Acentropinae species are located in the canopy of the forest.

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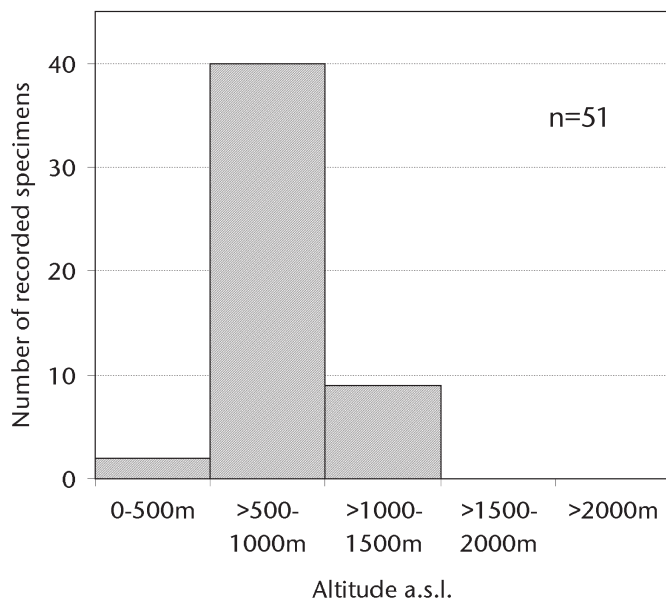


Fig. 5: Altitudinal distribution of *Eoophyla dendrophila* n. sp. in northern Borneo; n = 51 (number of specimens for which adequate information on the altitude of light trapping site was available).

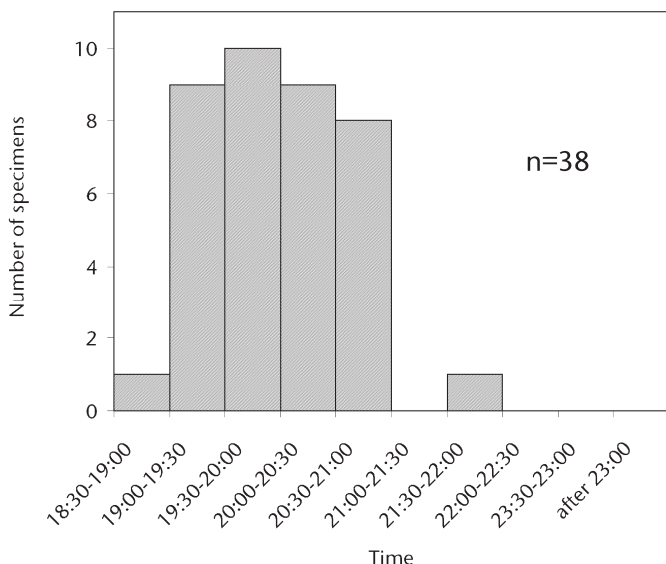


Fig. 6: Flight activity pattern of *Eoophyla dendrophila* n. sp.; n = 38 (number of specimens for which adequate information on the time when they have been attracted by light was available).

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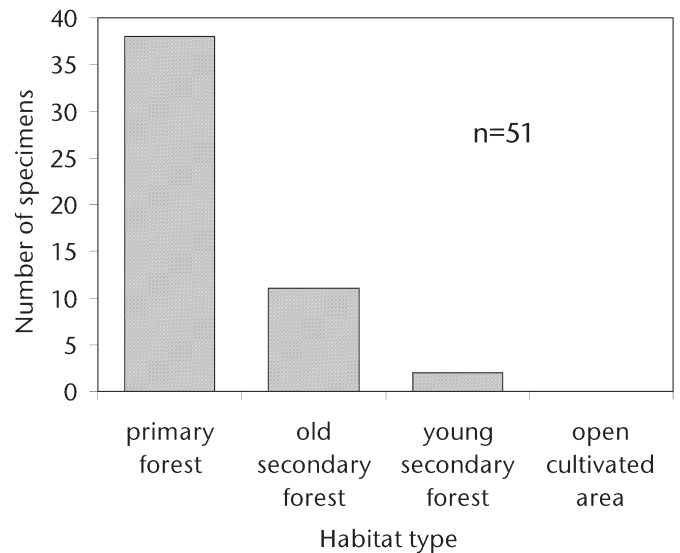


Fig. 6: Habitat preference of *Eoophyla dendrophila* n. sp.; n = 51 (number of specimens with adequate information on sampling sites).

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## References

- KITAYAMA, K. (1992): An altitudinal transect study of the vegetation on Mount Kinabalu, Borneo. — *Vegetatio* **102**: 149–171.
- SCHULZE, C. H. (2000): Auswirkungen anthropogener Störungen auf die Diversität von Herbivoren — Analyse von Nachtfalterzönosen entlang von Habitatgradienten in Ost-Malaysia. [Effects of anthropogenic disturbance on the diversity of herbivores — An analysis of moth species assemblages along habitat gradients in East Malaysia.]. — PhD thesis, University of Bayreuth (Germany).
- SPEIDEL, W., & MEY, W. (1999a): Catalogue of the Oriental Acentropinae (Lepidoptera, Crambidae). — *Tijdschrift voor Entomologie* **142**: 125–142.
- , & — (1999b): Die Gattung *Eoophyla* auf den Philippinen II. — *Esperiana*, Buchreihe zur Entomologie, Schwanfeld, **7**: 469–471, pl. 23, figs. 3–4.
- SNELLEN, P. C. T. (1876): Over *Oligostigma* GUENÉE, een genus der Pyraliden. — *Tijdschrift voor Entomologie* **19**: 186–209, pls. 8–9.
- YOSHIYASU, Y. (1985): A systematic study of the Nymphulinae and the Musotiminae of Japan (Lepidoptera: Pyralidae). — *Scientific Report of the Kyoto Prefecture University (Agriculture)* **37**: 1–162.
- (1987): The Nymphulinae (Lepidoptera: Pyralidae) from Thailand, with descriptions of a new genus and six new species. — Pp. 133–184 in KUROKO, H., & MORIUTI, S. (eds.) *Microlepidoptera of Thailand* (1), 184 pp.

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